

Exploration Technology Development including Surface Acoustic Wave RFID chips

Completed Technology Project (2012 - 2013)



Project Introduction

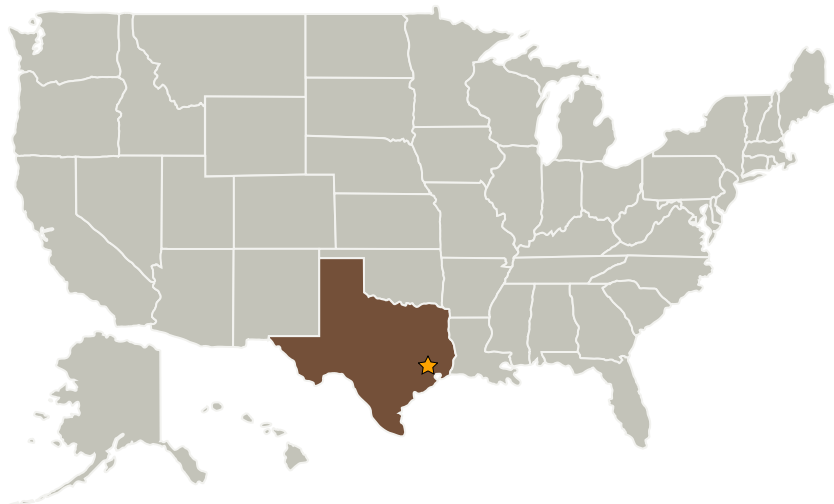
This project is focused on maturing future surface exploration technologies and instrumentation and working towards flight instrumentation and systems to support future robotic exploration efforts. The main portion of this project advances a JSC remote sensing method employing passive wireless surface acoustic wave (SAW) devices integrated with a retro-reflector antenna and mounted on a penetrator probe. Placement of the penetrator probes into the surface layers of a small body would allow direct measurements of surface temperatures, temperatures at multiple points around the body of interest, surface and subsurface temperature measurements over multiple diurnal cycles, surface feature movement and precise relative navigation aid

The small size and low weight of these battery-free SAW tags enable long-range, long duration remote temperature sensing instruments as well as a relative navigation waypoint network. This project can eventually provide a unique scientific instrument to be flown on multiple robotic probes. Additional exploration technologies will be identified and assessed for their applicability for future surface, small body and planetary exploration (e.g. Naval Research Lab miniature microbial fuel cell, modulating retroreflector, X-band switchable radio/radar).

Anticipated Benefits

Outcomes: Analyses for system performance in a deep space environment, breadboard-level hardware fabricated for laboratory testing, preliminary system concept for a flight quality article

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Center Innovation Fund: JSC CIF

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Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations
Texas

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Carlos H Westhelle

Project Manager:

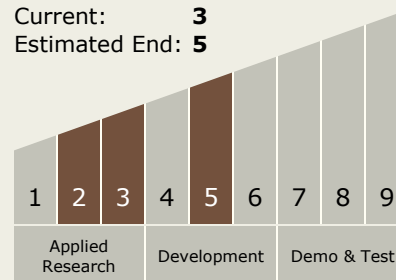
Lee D Graham

Principal Investigator:

Lee D Graham

Technology Maturity (TRL)

Start: 2
 Current: 3
 Estimated End: 5



Technology Areas

Primary:

- TX04 Robotic Systems
 - TX04.2 Mobility
 - TX04.2.4 Surface Mobility